

STATE OF ALASKA

*Jay S. Hammond, Governor*



Annual Performance Report for

COLLECTION AND INTERPRETATION  
OF INFORMATION NEEDED TO  
SOLVE SPECIAL MANAGEMENT PROBLEMS

by

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Collection and Interpretation of Information Needed to Solve Special Management Problems **Artwin Schmidt**

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## RESEARCH PROJECT SEGMENT

State: ALASKA

Name: Sport Fish Investigations  
of Alaska

Project No.: F-9-9

Study No.: G-I

Study Title: INVENTORY &amp; CATALOGING

Job No.: G-I-S

Job Title: Collection and Interpretation  
of Information Needed to  
Solve Special Management  
Problems

Period Covered: July 1, 1976 to June 30, 1977

## ABSTRACT

Due to the specialized nature of the investigations being carried on under Job No. G-I-S, a separate section is devoted to each of the job objectives.

## Section 1

This job was completed and final recommendations submitted in last year's report (Schmidt and Robards, 1976).

## Section 2

Additional or new information was received and filed on 14 streams and 17 lakes in southeast Alaska. This included data on fish species and abundance, population dynamics, biological surveys, and recreational surveys. Effort was devoted to acquire copies of research and management data collected by other biologists.

## Section 3

The population size and distribution of brook trout, Salvelinus fontinalis (Mitchill), was determined in Salmon Creek Reservoir near Juneau. This study was conducted because of public pressure to increase the daily bag limit. Mark/recapture techniques estimated the population to be 1,250 fish. This estimate ranges from 1,042 to 1,562 at the 95% confidence level. Fish were concentrated in the shallow areas of the lake. Catch per unit effort (CPUE) of 218 traps set in water shallower than 6 meters was 1.40 fish/trap, while CPUE of 122 traps set deeper than 6 meters was 0.82 fish/trap. Of the shallow trap sets, those set in areas of rockslides or rocky substrate produced the highest catches. The average condition factor of fish sampled was 1.06, indicating no sign of stunting

or overpopulation. The length-weight relationship of these brook trout was computed to be  $\log_n W = 11.29 + 2.97 \log_n L$  where  $W$  = total weight in grams and  $L$  = fork length in millimeters. The coefficient of determination ( $r^2$ ) for this curve was 0.98. It is recommended that the daily bag limit not be increased.

## OBJECTIVES

1. Determine the effectiveness of hydroacoustic equipment in the estimation of fish abundance, distribution, and size of lakes.
2. To continue collection, analysis, and organization of all available and new information on sport fish resources of southeastern Alaska.
3. Determine the population size and distribution of eastern brook in Salmon Creek Reservoir.

### SECTION 1

#### OBJECTIVE

To determine the effectiveness of hydroacoustic equipment in the estimation of fish abundance, distribution, and size of lakes.

This job was completed and final recommendations submitted in last year's report (Schmidt and Robards, 1976).

### SECTION 2

#### OBJECTIVE

To continue collection, analysis, and organization of all available and new information on sport fish resources of southeastern Alaska.

#### ABSTRACT

Additional or new information was received and filed on 14 streams and 17 lakes in southeast Alaska. This included data on fish species and abundance, population dynamics, biological surveys, and recreational surveys. Effort was devoted to acquire copies of research and management data collected by other biologists.

#### BACKGROUND

The Inventory and Catalog File was created to provide a library for the collection of reports of management actions, research data, development plans, and other information of interest for each aquatic system in

southeast Alaska. This file is maintained in duplicate in Juneau and Sitka Department of Fish and Game offices. It was organized in 1972 (Schmidt and Robards, 1973) to facilitate the dissemination of information to resource agency personnel and the interested public.

#### RECOMMENDATION

Continue collection, analysis, and organization of available new information on sport fish resources in southeast Alaska. A summary should be prepared listing the reports on file to advise other researchers of the information available in the Inventory and Catalog Aquatic Systems File.

#### TECHNIQUES USED

New and additional information was received and filed under the system described by Schmidt and Robards (1973). Other researchers were contacted, and copies of their recent fieldwork were requested and received. Information was added to our files on the following systems:

- Aleck's Creek (Kuiu Island)
- Chamberlain Lake (Revillagigedo Island)
- Essowah Lakes (Dall Island)
- Finger Lake (Prince of Wales Island)
- Freshwater Bay Stream (Chichagof Island)
- Game Creek (Chichagof Island)
- Gartina Creek (Chichagof Island)
- Gypsum Creek (Chichagof Island)
- Heckman Lake (Revillagigedo Island)
- Image Lake (Prince of Wales Island)
- Jordan Lake (Revillagigedo Island)
- Kadake Creek (Kuiu Island)
- Karta River (Prince of Wales Island)
- Little Goose Creek (Chichagof Island)
- Moss Lake (Prince of Wales Island)
- Naha River (Revillagigedo Island)
- Orton Lake (Revillagigedo Island)
- Patching Lake (Revillagigedo Island)
- Raven Lake (Prince of Wales Island)
- Roosevelt Lagoon (Revillagigedo Island)
- Salmon Creek Reservoir (Juneau)
- Sarkar Lagoon (Prince of Wales Island)
- Seagull Creek (Chichagof Island)
- Seal Creek (Chichagof Island)
- Sitkoh Creek (Chichagof Island)
- Snow Lake (Revillagigedo Island)
- Spare Lake (Prince of Wales Island)
- Tammy Lake (Prince of Wales Island)
- Tenakee Inlet Stream (Chichagof Island)
- Trail River (Chichagof Island)
- Wukuklook Creek (Chichagof Island)

## SECTION 3

### OBJECTIVE

Determine the population size and distribution of eastern brook in Salmon Creek Reservoir.

### ABSTRACT

The population size and distribution of brook trout, Salvelinus fontinalis (Mitchill), was determined in Salmon Creek Reservoir near Juneau. This study was conducted because of public pressure to increase the daily bag limit. Mark/recapture techniques estimated the population to be 1,250 fish. This estimate ranges from 1,042 to 1,562 at the 95% confidence level. Fish were concentrated in the shallow areas of the lake. Catch per unit effort (CPUE) of 218 traps set in water shallower than 6 meters was 1.40 fish/trap, while CPUE of 122 traps set deeper than 6 meters was 0.82 fish/trap. Of the shallow trap sets, those set in areas of rock-slides or rocky substrate produced the highest catches. The average condition factor of fish sampled was 1.06, indicating no sign of stunting or overpopulation. The length-weight relationship of these brook trout was computed to be  $\log_n W = -11.29 + 2.97 \log_n L$  where  $W$  = total weight in grams and  $L$  = fork length in millimeters. The coefficient of determination ( $r^2$ ) for this curve was 0.98. It is recommended that the daily bag limit not be increased.

### BACKGROUND

Salmon Creek Dam and Reservoir are located 3 miles (4.8 km) upstream from the mouth of Salmon Creek. The dam, located at 58°20'30" N latitude, 134°24'20" W longitude, is a concrete arch structure which was completed in 1915 for the Gastineau Mining Company. Salmon Creek Reservoir is about 1.2 miles (1.9 km) long and at the widest point about 0.3 miles (0.5 km) wide. Drainage area behind the dam is 4.3 miles<sup>2</sup> (11.2 km<sup>2</sup>). The present total capacity of the reservoir is 17,585 acre feet (21.7 hm<sup>3</sup>) with surface area of 192 acres (0.87 km<sup>2</sup>) (Balding, 1974).

Brook trout, Salvelinus fontinalis (Mitchell), fingerlings were originally planted in Salmon Creek Reservoir in 1917 by Joe Sprague of Juneau. The original stock was obtained as eyed eggs from a hatchery in Leadville, Colorado. In 1927 the reservoir was again stocked with 13,150 brook trout. The later plant was very successful and produced excellent fishing during the 1930's. The fishery has declined and fluctuated since that time. Possible causes include excessive winter drawdown of the reservoir and a change in type and abundance of food organisms.

The reservoir receives moderate fishing pressure during the summer months and has provided good ice fishing during the winter. Results from a voluntary report box located on the Salmon Creek trail during the period May 22 through August 30, 1960, revealed a catch rate of 1.6 fish per hour (Baade, 1961).

The daily bag and possession limit for Salmon Creek Reservoir was 30 fish prior to March 1975, while the daily bag limit in all other waters of southeast Alaska was 15 fish. After March 1976 the daily bag limit was reduced from 15 to 10 fish, and the double bag limit for Salmon Creek Reservoir was eliminated. This reduction caused considerable public pressure to again increase the Salmon Creek Reservoir daily bag limit. On January 9, 1976, an emergency regulation went into effect for a 120-day period. This temporary regulation again allowed a double bag limit (20 fish) in Salmon Creek Reservoir.

After the adverse reaction to the reduced bag limit the Sport Fish Division initiated a research program to evaluate the size and distribution of brook trout in Salmon Creek Reservoir. This report serves as a summary of that research.

## RECOMMENDATIONS

It is recommended that the daily bag and possession limits for brook trout in Salmon Creek Reservoir not be increased. The daily bag limit should be no higher than 10 fish and the possession limit no greater than two daily bag limits.

## TECHNIQUES USED

### Spacial Abundance and Distribution of Brook Trout

Spacial distribution and abundance of brook trout was determined by capturing fish in traps baited with salmon roe and employing mark/recapture ratios. Traps were fished systematically throughout the lake so all areas were sampled.

Traps used to capture fish were constructed of 0.5-inch mesh hardware cloth and were 36 inches (91.4 cm) long and 16 inches (40.6 cm) with entrance funnels having aperture of 2 inches (5.1 cm) on either end. Gee traps were used to capture the smaller size classes of fish. Gee traps are 42 cm long and 22.5 cm diameter with 2.5 cm aperture.

During the period June 15 through July 16 all fish captured in the large traps were marked with an upper lobe caudal clip. During this initial marking period a multiple census (Schnabel type) was conducted. No fish were removed from the population.

After marked fish had distributed themselves throughout the lake for 7 weeks another capture and marking effort was expended from September 8 through September 25. Fish were marked with a lower lobe caudal clip. Upon completion of trapping, a sample was taken with gill nets to assure that sampling with traps was not missing a segment of the population. Population estimates and ranges were calculated by the Schnabel and Schumacher methods.

An attempt was made to capture and mark small rearing fish in the inlets and around the shoreline with Gee traps. Gee traps were fished in



strings from long lines in shallow water near the shoreline. All fish so captured were marked with an adipose clip in an attempt to enumerate this segment of the population.

#### Length Frequency, Growth, Condition Factor, and Food Habits

The length of fish captured in all traps was recorded as fork length after fish were anesthetized with MS-222. Length measurements were taken throughout the study period.

Growth rate of fish was determined from fish sampled at the end of the study period. Otoliths were taken from gill-net caught fish and preserved for later analyses.

Condition factor of fish was determined from total length and weight of fish captured in gill nets.

Food habits of brook trout were determined from trap and net caught fish. Traps used to catch fish for stomach analysis had the bait eggs in containers so fish could not eat the bait. Stomach contents were preserved in 70% ETOH for laboratory identification. Laboratory analysis consisted of identifying and counting organisms.

#### Zooplankton

Zooplankton were collected by making duplicate vertical tows from 100 m with each of two nets. Nets used were 0.5 m diameter and 3 m long. Straining cloth of the No. 10 Nitex net had aperture of 153 microns and 45% open area, while the No. 20 Nitex net had aperture of 80 microns and 35% open area. Plankton were identified and counted. Dry and ash weight of plankton were determined gravimetrically. Efficiency of nets was not accounted for in calculations.

### RESULTS

#### Abundance and Spacial Distribution of Brook Trout

Brook trout were captured and marked during the periods of June 17 through July 16 and September 8 through September 25. A Schumacher-Eschmeyer (1943) population estimate and associated data are presented in Table 1. The population estimate of brook trout captured by traps was 1,250. This population estimate at the 95% confidence level falls within the range of 1,042 to 1,562 individuals. The Schnabel population estimate calculated from trap data was very comparable at 1,149 fish (Table 2).

Another Schumacher-Eschmeyer population estimate was calculated using both trap and gill-net data (Table 1). This estimate of 1,476 is higher because one of the gill nets did not capture any marked fish. The range of this population estimate at the 95% confidence level varies from 1,200 to 1,916.

Table 1. Estimation of brook trout population by Schumacher method, Salmon Creek Reservoir, 1976.

Date	C <sub>t</sub>	Capture Method	R <sub>t</sub>	R	M	M <sub>t</sub>	M <sub>t</sub> R <sub>t</sub>	Σ(M <sub>t</sub> R <sub>t</sub> )	C <sub>t</sub> M <sub>t</sub> <sup>2</sup>	Σ(C <sub>t</sub> M <sub>t</sub> <sup>2</sup> )	$\frac{\hat{1}}{N} = \frac{\Sigma(M_t R_t)}{(C_t M_t^2)}$
June 17	5	MT*	0	0	5	0	0	0	0	0	0
18	8	MT	0	0	8	5	0	0	200	200	0
22	2	MT	0	0	2	13	0	0	338	538	0
24	4	MT	0	0	4	15	0	0	900	1,438	0
25	13	MT	0	0	13	19	0	0	4,693	6,131	0
July 8	13	MT	3	3	10	32	96	96	13,312	19,443	203
9	17	MT	1	4	16	42	42	138	29,988	49,431	358
12	18	MT	3	7	15	58	174	312	60,552	109,983	353
13	6	MT	0	7	6	73	0	312	31,974	141,957	455
14	2	MT	0	7	2	79	0	312	12,482	154,439	495
15	17	MT	2	9	15	81	162	474	111,537	265,976	561
16	19	MT	1	10	18	96	96	570	175,104	441,080	774
September 8	49	MT	8	18	41	114	912	1,482	636,804	1,077,884	727
9	33	MT	2	20	31	155	310	1,792	792,825	1,870,709	1,044
10	30	MT	6	26	24	186	1,116	2,908	1,037,880	2,908,589	1,000
13	19	MT	1	27	18	210	210	3,118	617,400	3,525,989	1,131
14	14	MT	4	31	10	228	912	4,030	727,776	4,253,765	1,056
15	19	MT	4	35	15	238	952	4,982	1,076,236	5,330,001	1,070
16	40	MT	9	44	31	253	2,277	7,259	2,560,360	7,890,361	1,087
17	25	MT	5	49	20	284	1,265	8,524	1,600,225	9,490,586	1,113
21	18	MT	3	52	15	304	912	9,436	1,663,488	11,154,074	1,182
22	16	MT	4	56	0	319	1,276	10,712	1,628,176	12,782,250	1,193
	16	GN**	0	52	0	319					
	32	MT + GN	4	56	0	319	1,276	10,712	3,256,352	14,410,426	1,345***
23	18	MT	3	59	0	315	945	11,657	1,786,050	14,568,300	1,250****
				59			945	11,657	1,786,050	16,354,350	1,403***
25	32	GN	5	64	0	315	1,575	13,232	3,175,200	17,743,500	1,341*****
				64			1,575	13,232	3,175,200	19,529,550	1,476*****

C<sub>t</sub> The total sample taken on day t.R<sub>t</sub> The number of recaptures in the sample C<sub>t</sub>.M The number of fish marked from the sample C<sub>t</sub>.M<sub>t</sub> The number of marked fish in the lake when the t<sup>th</sup> sample is drawn.R ΣR<sub>t</sub>, the total of recaptures in the experiment.

N The population present throughout the experiment.

\*Minnow trap.

\*\*Gill net.

\*\*\*Estimate includes gill-net catch of September 22.

\*\*\*\*Final estimate based on minnow trap catches.

\*\*\*\*\*Estimate includes gill-net catch of September 25.

\*\*\*\*\*Estimate includes gill-net catches of September 22 and 25.

Table 2. Estimation of brook trout population by Schnabel method, Salmon Creek Reservoir, 1976.

Date	$C_t$	$R_t$	$M$	$M_t$	$R$	$C_t M_t$	$\Sigma(C_t M_t)$	$N = \frac{\Sigma(C_t M_t)}{R + 1}$
June 17	5	0	5	0	0	0	0	0
18	8	0	8	5	0	40	40	0
22	2	0	2	13	0	26	66	0
24	4	0	4	15	0	60	126	0
25	13	0	13	19	0	247	373	0
July 8	13	3	10	32	3	416	789	263
9	17	1	16	42	4	714	1,503	376
12	18	3	15	58	7	1,044	2,547	364
13	6	0	6	73	7	438	2,985	426
14	2	0	2	79	7	158	3,143	449
15	17	2	15	81	9	1,377	4,520	502
16	19	1	18	96	10	1,824	6,344	634
September 8	49	8	41	114	18	5,586	11,930	663
9	33	2	31	155	20	5,115	17,045	852
10	30	6	24	186	26	5,580	22,625	870
13	19	1	18	210	27	3,990	26,615	986
14	14	4	10	228	31	3,192	29,807	962
15	19	4	15	238	35	4,522	34,329	981
16	40	9	31	253	44	10,120	44,449	1,010
17	25	5	20	284	49	7,100	51,549	1,052
21	18	3	15	304	52	5,472	57,021	1,097
22	16	4	0	319	56	5,104	62,125	1,109
23	18	3	0	315	59	5,670	67,795	1,149

$C_t$  The total sample taken on day t.

$R_t$  The number of recaptures in the sample  $C_t$ .

$M$  The number of fish marked from the sample  $C_t$ .

$M_t$  The number of marked fish in the lake when the t<sup>th</sup> sample is drawn.

$R$   $\Sigma R_t$ , the total of recaptures in the experiment.

$N$  The population present throughout the experiment.

A population estimate of small rearing fish (50 to 90 mm) was not possible. No fish were captured in the inlet streams. Recaptures of adipose-clipped fish marked from the smaller Gee traps set around the shoreline were insignificant.

The population of brook trout in Salmon Creek Reservoir is distributed throughout the benthic area but is more concentrated above 6 m. Traps were not fished in the pelagial area of the lake because of the difficulty in anchoring suspended traps.

Comparison of the map showing bottom contours of Salmon Creek Reservoir (Figure 1) and the map showing locations of traps during the spring (Figure 2) show that most spring sets were in deep water. Most sets made during the fall sampling period (Figure 3) were in shallow water less than 6 m deep. Catch per unit effort of 218 traps set in water less than 6 m was 1.40 fish/trap. Catch per unit effort of 122 traps set deeper than 6 m was 0.82 fish/trap.

Shallow shoreline sets differed considerably in catch success. Traps set in areas of rockslides or on rocky substrate produced higher catches than those set along a sandy shoreline.

#### Length Frequency, Growth, Condition Factor, and Food Habits

The length frequency of brook trout captured in Salmon Creek Reservoir is shown in Figure 4. The most abundant size class captured was 230 to 239 mm. Over 10% of all fish captured were in this size group. This corresponds with an estimated age of 5.5 to 6 years old (Table 3). The longest fish captured was 301 mm and was 9 years old.

The length-weight relationship of brook trout in Salmon Creek Reservoir is represented by the exponential curve  $\log_n W = -11.29 + 2.97 \log_n L$  where  $W$  = total weight in grams and  $L$  = fork length in millimeters. The coefficient of determination ( $r^2$ ) for this curve was computed to be 0.98. This length-weight relationship with ages of brook trout are portrayed graphically in Figure 5.

The mean condition factor of 67 fish from the length range of fish sampled was 1.06, the range of condition factors was 0.61 to 1.26, and the standard deviation was 0.11.

The condition factor of brook trout by age class is presented in Table 4. These condition factors ranged from 0.97 to 1.13.

Food habits of brook trout varied widely by individual and probably reflect availability (Table 5).

#### Zooplankton

Zooplankton analyses from Salmon Creek Reservoir are presented in Table 6. The most abundant organisms were rotifers. Daphnia sp. were by far the most abundant of the larger crustaceans.

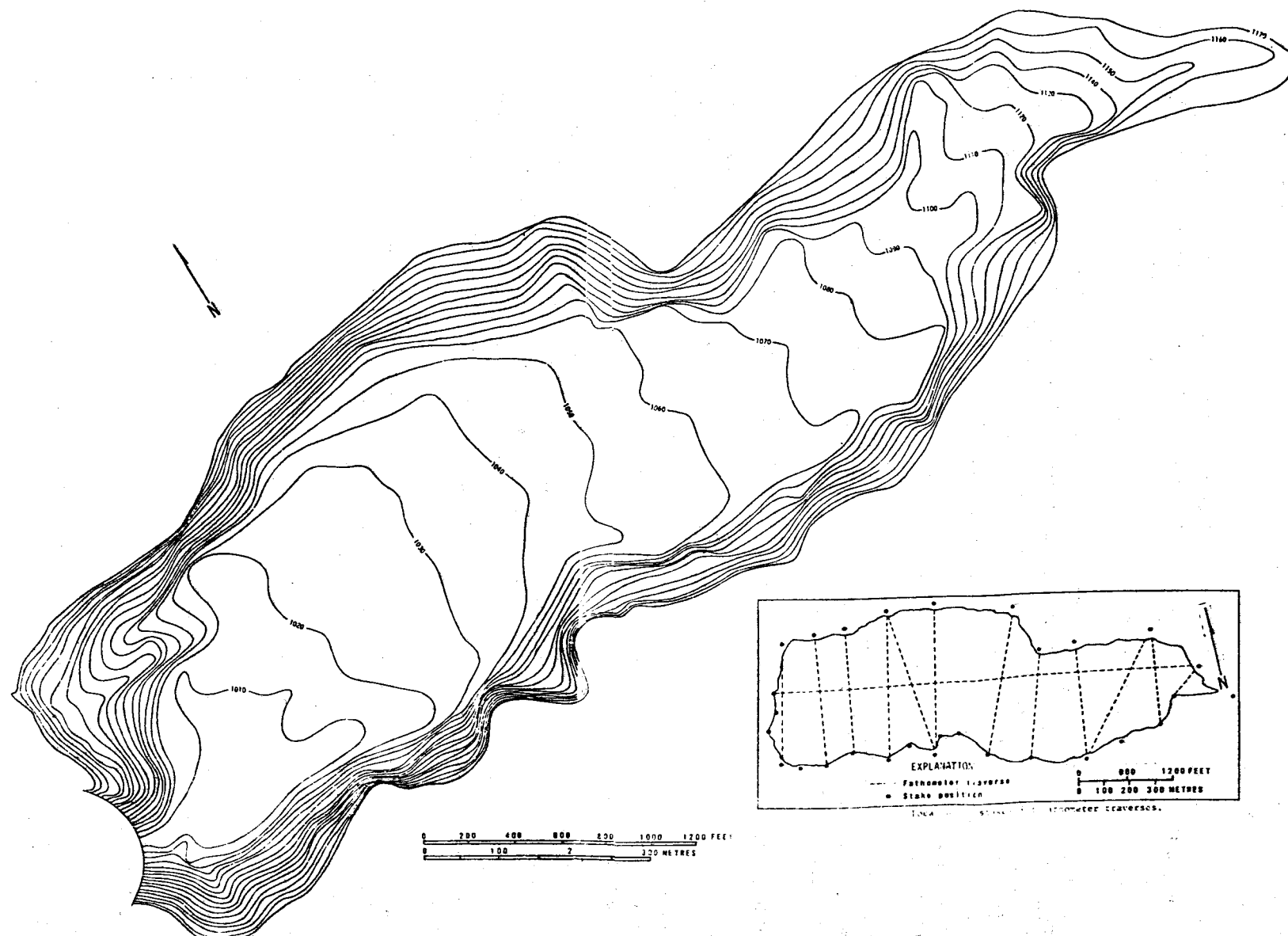


Figure 1. Bottom contour map of Salmon Creek Reservoir (from Balding, 1974).

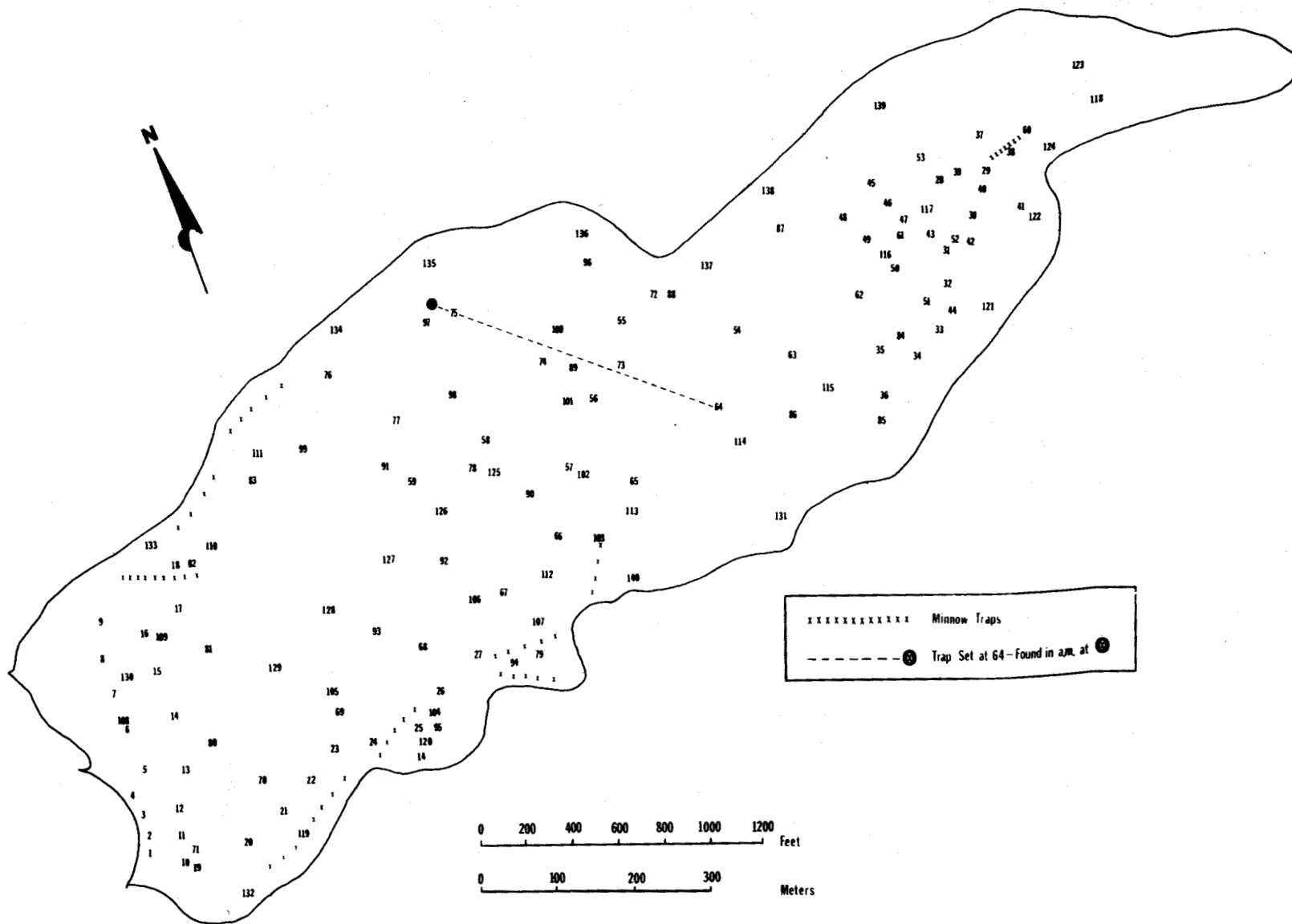


Figure 2. Trap set locations numbered consecutively, Salmon Creek Reservoir, June 17 - July 16, 1976.

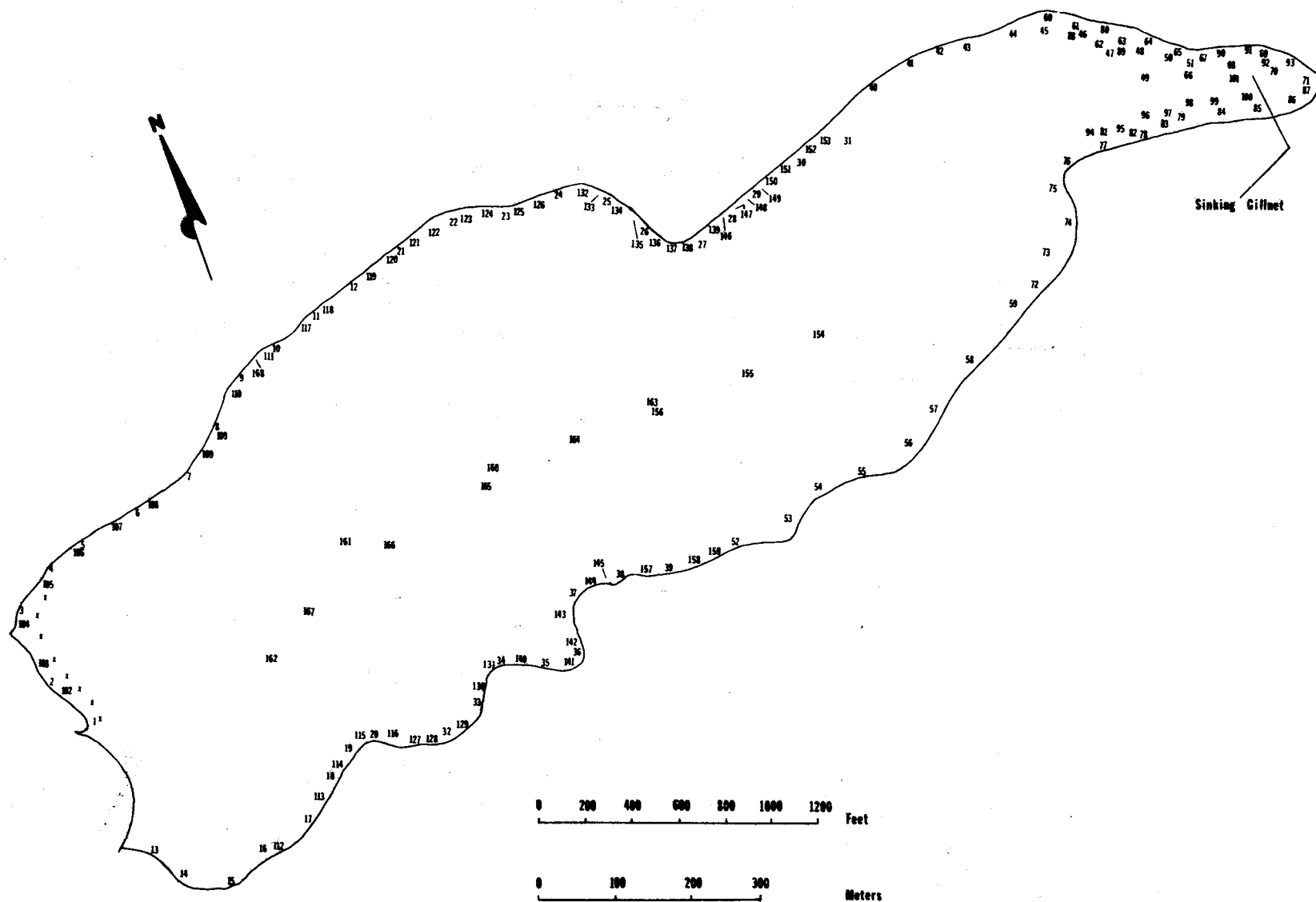


Figure 3. Trap set locations numbered consecutively, Salmon Creek Reservoir, September 8-25, 1976.

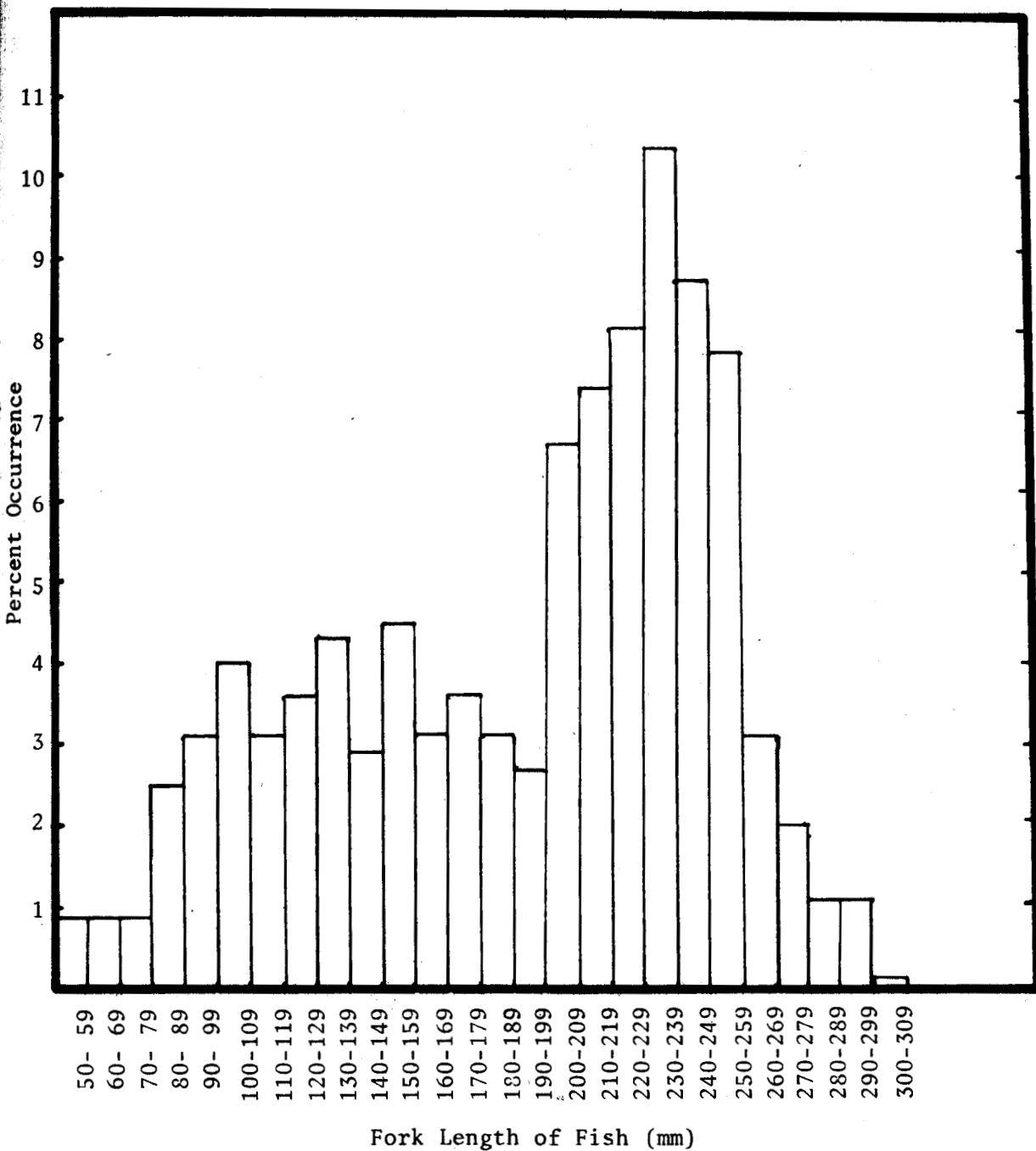


Figure 4. Percent occurrence of brook trout captured by 10 mm increment, Salmon Creek Reservoir, 1976.



Table 3. Total length\* of brook trout by age class, Salmon Creek Reservoir, 1976.

<u>Age</u>	<u>Number</u>	<u>Mean Length (mm)</u>	<u>Range (mm)</u>	<u>Standard Deviation (mm)</u>
1	1	59		
2	1	117		
3	8	168	160-182	8
4	12	191	151-228	29
5	11	226	202-289	24
6	15	240	214-263	12
7	9	253	229-283	16
8	3	263	245-278	16
9	1	301		

\*Total length = 1.03 x fork length.

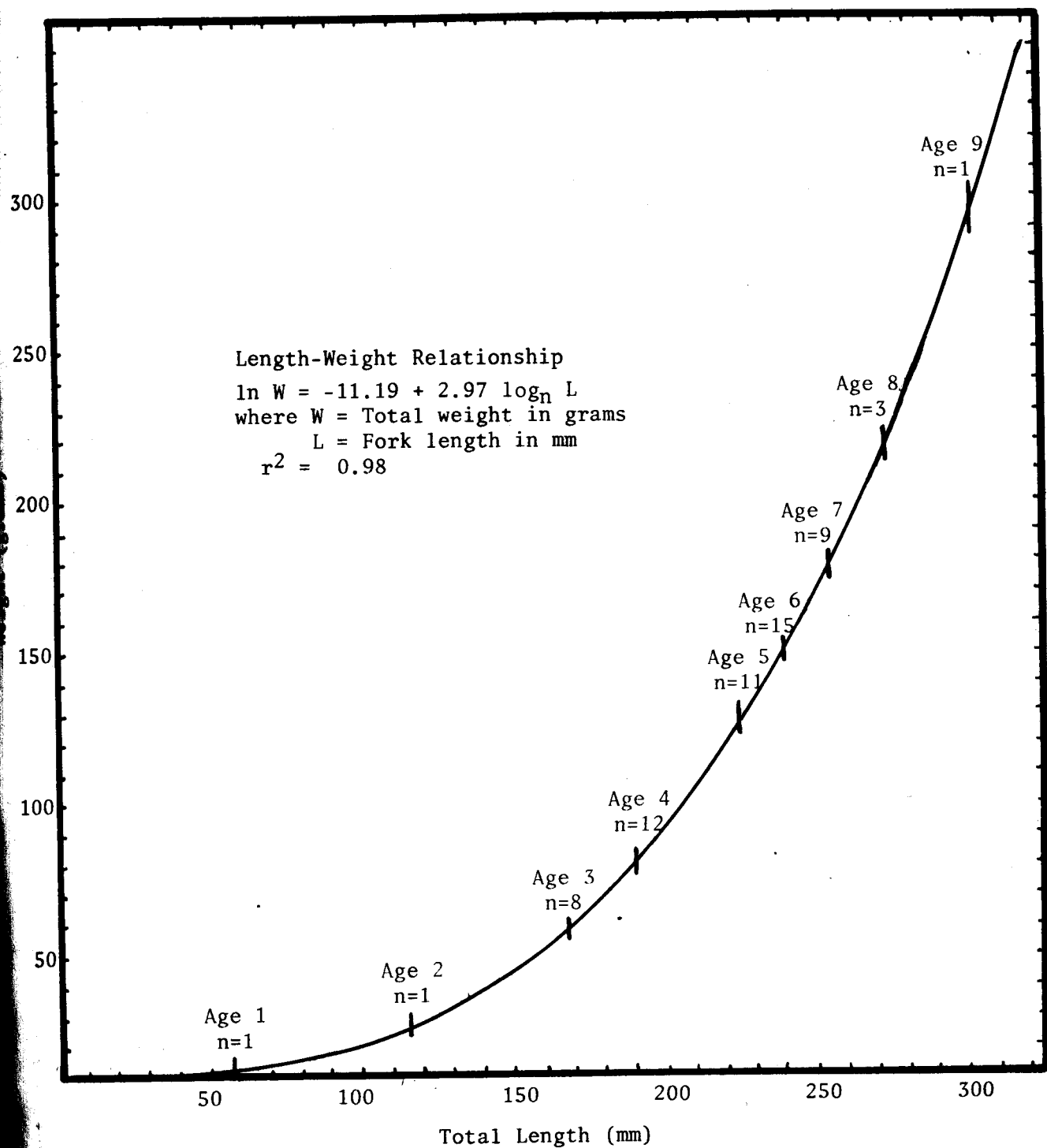


Figure 5. Length-weight-age relationship of brook trout in Salmon Creek reservoir, 1976.

Table 4. Condition factor (K)\* of brook trout by age class, Salmon Creek Reservoir, September 22-25, 1976.

<u>Age</u>	<u>Number</u>	<u>Mean Total Length (mm)</u>	<u>Mean Total Weight (g)</u>	<u>Condition Factor</u>	
				<u>Mean</u>	<u>Range</u>
1	1	59	2		
2	1	117	18	1.12	
3	8	168	50	1.04	0.61-1.2
4	12	191	81	1.11	0.95-1.2
5	11	226	135	1.13	0.97-1.2
6	15	240	143	1.00	0.91-1.1
7	9	253	170	1.03	0.87-1.2
8	3	263	189	1.04	0.97-1.1
9	1	301	309	1.13	

$$*K = \frac{100 \times \text{weight (g)}}{\text{Total length (cm)}^3}$$

Table 5. Stomach content analysis of brook trout, Salmon Creek Reservoir, 1976.

Fish Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Length (mm)	213	239	196	234	204	155	253	209	222	238	241	238	243	248	156	169	178	224	155	225	179	218	258	237	192	186	230	213	254	232	240	158
Sex	F	M	M	F	F	F	F	M	M	M	F	M	F	F	F	M	M	M	F	F	F	M	F	M	M	M	M	M	F	F	F	F
Gastropoda																								1								
Hirudinea																																
Isopoda																																
Oligochaeta																																
Ephemeroptera																																
<u>Baetis bicaudatus</u>																			2													
<u>Baetis sp.</u>					30									1																		
<u>Cinygmula sp.</u>					2																											
<u>Ephemerella sp.</u>																																
<u>Siphonuris sp.</u>														1																		
Plecoptera																																
<u>Alloperla sp.</u>					5									4				1											2			
Coleoptera	1	1											1			1													1			
Carabidae										1																						
Dytiscidae																																
Elateridae																																
Staphylinidae																																
Trichoptera																																
Limnephilidae					1			9		2				1	2			1				1										
Rhyacophilidae																														3		
<u>Rhyacophila lobifera</u>																																
<u>R. fuscula</u>														5																	1	
Diptera	6		1	231			95	1	8	2	230		5	1	141	2	315	1	1	4	100	2		2	8	1	111		9	50	87	34
Bibionidae			1					1														2		2						13		
Chironomidae				231					8	2			1	1	1	1	315	4		1						1	111			65	34	
Empididae																																
Tipulidae																																
Homoptera																																
Aphidae																																
Hymenoptera							95			1										1												
Lepidoptera	7								8		7	2							1		20		2					1		25	2	
Zooplankton																																
Shrew																									1							

Table 5. (Cont.) Stomach content analysis of brook trout, Salmon Creek Reservoir 1976.

Fish Number	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Length (mm)	229	215	227	213	292	248	204	215	224	155	255	221	175	266	197	220	290	251	211	227	268	217	207	231	228	235	170	113	146	126	164	159
Sex	M	M	M	F	F	M	F	M	M	M	F	M	M	F	M	F	M	M	M	M	F	M	M	M	M	M	F		M	M	M	F
Gastropoda																																
Hirudinea		1																														
Isopoda														1																		
Oligochaeta				1																												
Ephemeroptera																																
<u>Baetis bicaudatus</u>														1		6																
<u>Baetis sp.</u>									2							6												1		2		
<u>Cinygmula sp.</u>																					1											
<u>Ephemerella sp.</u>																1									1							
<u>Siphonurris sp.</u>																																
Plecoptera											1					3																
<u>Alloperla sp.</u>																5															1	
Coleoptera								1																								
Carabidae																										1						
Dytiscidae																1								3								
Elateridae																																
Staphylinidae																2		1		1												
Trichoptera																																
Limnephilidae				53	5	3	4	21		1				18	3	6	1			1		5	8		2		1					1
Rhyacophilidae								2						3		2	1	1								5	6	7	2		4	8
<u>Rhyacophila lobifera</u>																										5	2			1	1	
<u>R. fuscula</u>																																
Diptera	7	7			2	2	3	12	4	54	1	4				76	2	1		3	2	1	14		34	12	13		5	14	39	
Bibionidae		2						2																	5	1						
Chironomidae	6	1			2	2	2	5	3	26	1					68	1			1	2	1			25	10	13		5		38	
Empididae		3														8									4						10	
Tipulidae										28																						
Homoptera																																
Aphidae																1										1						
Hymenoptera								1	1		1					1										1						
Lepidoptera																1				5					1							
Zooplankton	65																															
Shrew																																

Table 6. Plankton composition, density (organisms per square meter) and weight (milligrams per square meter) as collected with No. 10 and No. 20 Nitex plankton nets, Salmon Creek Reservoir, 1976.

<u>Date</u>	<u>July 30</u>		<u>September 14</u>	
<u>Depth of Tow</u>	45	45	41	40
<u>Mesh Size</u>	10	20	10	20
Copepoda				
Calanoida				
<u>Diaptomus</u> sp.	254	10	0	0
Cyclopoida	764	35	0	0
Nauplii	1,019	0	0	255
Cladocera				
<u>Daphnia</u> sp.	764	173	24,446	8,658
<u>Bosmia</u> sp.	0	25	0	0
<u>Chydorus</u> sp.	509	15	1,273	0
Rotatoria				
<u>Keratella</u> sp.	10,440	198,623	1,528	829,124
<u>Asplancha</u> sp.	7,130	15,278	6,111	2,801
<u>Kellicottia</u> sp.	2,801	61,115	1,018	22,816
Miscellaneous	6,875	319,579	509	140,564
Dry Weight	16.3	91.7	155.8	155.8
Organic Weight	10.2	76.4	130.9	134.5
Ash Weight	6.1	15.3	21.4	25.0

## DISCUSSION

### Abundance and Distribution of Brook Trout

The population of catchable brook trout in Salmon Creek Reservoir is much lower than originally suspected. The population was estimated to be 1,042 to 1,562 at the 95% confidence level. No population estimate of rearing fish (50 to 90 mm) was possible, as few marked fish were recaptured. A population of this size does not justify a relaxed bag limit. If any adjustment to the limit were warranted, it would be a reduction. I do not feel this is necessary at this time; but if fishing pressure becomes too great, a reduction should be considered.

The brook trout are distributed throughout the benthic area of the lake but are much more abundant in the upper 6 m of the water column. They are often seen feeding on terrestrial drift at the lake's surface. Fish of all sizes (50 to 300 mm) congregate in shallow rocky areas.

### Length Frequency, Growth, Condition Factors, and Food Habits

The largest fish captured was 301 mm (11.8 inches), but the most abundant size group is about 235 mm (9.4 inches). These fish are 5 to 7 years old. Growth in this reservoir is probably retarded partially because of cold water temperature and short ice-free periods.

All fish captured were in healthy condition and had normal condition factors. The mean condition factor was 1.06. This condition factor compares favorably with other wild populations, as cited in Carlander (1969). This population shows no sign of overpopulation or stunting. Condition factor did not change significantly with age or length. Reproduction and spawning areas in the reservoir may be limited because of water level fluctuations.

Food habits of these brook trout are diversified. Stomach contents analyses indicate they eat anything that is available.

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